Greetings and welcome to the **SEPTEMBER 2014** edition of the WDFW Climate News Digest! Our purpose is to provide highlights of relevant climate change news, events and resources for WDFW staff. Feedback or suggestions for items to include in future editions are much appreciated – many *thanks* to those who have sent links and references and please keep them coming. Note that previous editions of the newsletter are now stored on the Habitat Program Sharepoint site -- http://sharepoint.dis.wa.gov/dfw/habitat/climatechange/default.aspx and on the agency's climate change web page.

Thanks for contributions this month from Dale Gombert, David Patte (USFWS), and Ellie Cohen (Point Blue Conservation).

WHAT'S HAPPENING AT WDFW?

FREE TRAINING on Climate Adaptation -- **October 28-30th, Climate Smart Conservation class, Olympia, WA.**

The North Pacific Landscape Conservation Cooperative is sponsoring a Climate-Smart Conservation class in Olympia, WA, Oct 28-30, which is based on the guide, "Climate Smart Conservation: Putting Adaptation Principles into Practice". The course is designed to provide guidance in how to carry out adaptation with intentionality, how to manage for change and not just persistence, how to craft climate-informed conservation goals, and how to integrate adaptation into on-going work. Conservation practitioners and natural resource managers will learn to become savvy consumers of climate information, tools, and models. See the course description and logistics on the **NCTC webpage for this class**.

LEARNING OPPORTUNITIES

September 4, 8:00-10:00 Pacific time, Columbia River Basin Impacts Assessment – Preparing for Climate Change" -- Are you interested in learning more about the Climate Impacts Assessment and Reclamation's climate change activities? Please join us on September 4, 2014 for the first of a five-part series on policy, planning, & practice in the Pacific Northwest Region.
Reserve your webinar seat now at: https://www4.gotomeeting.com/register/755600967
September 4th -- "Reclamation Climate Change Policy", In this first talk you will find out about climate change policies and legislation that have resulted in Reclamation-wide activities to address climate change. An overview of DOI, Reclamation, and PN Region climate response actions will be presented including more details on the Assessment.

September 9th, 12:00 PM Pacific, "Extreme Climate Events and Species Population Dynamics: Overriding Influence or Not Such a Big Deal?", Keith H. Nislow, USDA Forest Service Northern Research Station and University of Massachusetts Amherst. In this talk, we review some of the basic determinants of population response to extreme events, using case studies based on long-term data from natural populations in the northeastern region, and present a modeling framework for evaluating the relative impacts of changes in timing, duration, and magnitude. We also consider the potential for human responses to perceived and actual risks from climate extremes to interact with, and in some cases override the direct effects of the events themselves. To register click here.

September 9th, 11:00 am-noon (Pacific Time) "Climate Change Adaptation for an at Risk Community - Shaktoolik Alaska"

Speaker: Terry Johnson, Alaska Sea Grant Marine Advisory Program, OneNOAA webinar, click here for more info

September 9-10, 2014, Seattle, Fifth Annual Pacific Northwest Climate Science Conference, http://pnwclimateconference.org/

The PNW Climate Science Conference annually brings together more than 250 researchers and practitioners from around the region to discuss scientific results, challenges, and solutions related to the impacts of climate on people, natural resources, and infrastructure in the Pacific Northwest. Emphasis is on talks that are comprehensible to a wide audience on topics of broad interest

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Monthly: NOAA Hosts Monthly Webinar Series on Climate Information for Managing Risks in Water Resources

Working with collaborators such as the U.S. National Integrated Drought Information System, Water Research Foundation, Water Environment Federation, Water Environment Research Foundation, and American Water Works Association, the Sectoral Applications Research Program in NOAA's Climate Program Office is hosting a series of webinars the third Thursday of every month. For a listing of webinars, visit this site.

RECORDED WEBINARS

NOAA Webinar Series on Ocean Acidification: See http://oceanacidification.noaa.gov/AreasofFocus/EducationOutreach/SOARCEWebinarSeries.aspx

RESOURCES

California Adaptation Forum - Presentations Available Online

With breakout sessions and presentations focusing on everything from technical guidance on developing sea level rise projections to discussions on community engagement to determining success (or progress) in adaptation, the conference touched on all facets of building resilience to climate change. Click here for access to recordings and Power Points from the Forum.

New Radio Program - Climate Connections

Climate Connections is a daily public radio series produced by the Yale Center for Environmental Communication. The program produces daily 90-second stories about how climate change is affecting life in North America and what individuals and groups are doing about it. Click here for more information.

Learn About Climate-Smart Agriculture

Climate Smart Agriculture is an integrated approach to achieve food security in the face of climate change, while also mitigating climate change and contributing to other development goals. Earlier this year, the U.S. Department of Agriculture announced the establishment of seven regional Climate Hubs to deliver information to farmers, ranchers and forest landowners in the United States to help them adapt to climate change and weather variability.
Click here for a short primer on Climate-Smart Agriculture.
Click here for the Climate-Smart Agriculture Sourcebook.

CLIMATE SCIENCE NEWS

NASA launches spacecraft to study carbon dioxide.
Just over a month after launch, the Orbiting Carbon Observatory-2 has been maneuvered into its final orbit and has produced its first science data. As NASA's first spacecraft dedicated to studying atmospheric carbon dioxide, OCO-2 will produce the most detailed picture to date of the manmade and natural sources of carbon dioxide, as well as their natural "sinks"—places on Earth's surface where carbon dioxide is removed from the atmosphere. The satellite will study how these sources and sinks are distributed around the globe and how they change over time."
http://earthobservatory.nasa.gov/IOTD/view.php?id=84159&eocn=home&eoci=iotd_grid

SPECIES AND HABITATS

Sea Canary for Ocean Acidification - Sea Butterflies' Shells Dissolve as pH Drops
Ocean acidification is potentially devastating for shell-forming organisms from corals to oysters, evidence shows. But to date, few studies have demonstrated acidification's effects in the wild. Now, new findings suggest one seafaring shell-maker could be the key to understanding its effects on the West Coast's ocean ecosystem. The animal is Limacina helicina, a small pteropod commonly called a "sea butterfly" because of its winglike extrusions that lend it the likeness of a flying, underwater snail. Researchers found 53 percent of near-shore sea butterflies showed signs of severe shell dissolution, compared to 24 percent in waters farther offshore. (The preindustrial rate of shell dissolution is estimated at about 20 percent.) By 2050, the researchers estimate severe shell dissolution will increase by as much as 70 percent in near-shore waters.
Bednarsek N., Feely,R.A., Reumet, J.C.P., Peterson, B., Menke, J., Alin, S.R., Hales, B. (2014) Limacina helicina shell dissolution as an indicator of declining habitat suitability owing to ocean acidification in the California Current Ecosystem. Proceedings of the Royal Society B, 281, 20140123.
doi.org/10.1098/rspb.2014.0123

Butterflies' evolutionary responses to warmer temperatures may compromise their ability to adapt to future climate change
(excerpt from Science Daily)
Members of the brown argus butterfly species that moved north in response to recent climate change have evolved a narrower diet dependent on wild Geranium plants, researchers report. However, butterflies that did not move north have more diverse diets, including plants such as Rockrose that are abundant in southern parts of the UK…So although rapid evolutionary changes have allowed the brown argus to move north and track the warming climate, they have led to a more restricted diet. This increased specialization may limit this butterfly's continued spread north, into areas where Rockrose is common. "Our data confirm that rapid evolutionary change in a species' diet is important for responding to recent climate change, but as a consequence, variation in this ecologically-important trait may be lost," said Dr. Jon Bridle, co-author of the *Ecology Letters* study. "In addition, unlike the brown argus, many butterflies already have restricted

diets, so they may be unable to rapidly evolve changes in their diets to survive ongoing climate change," said co-author Dr. James Buckley.
James Buckley, Jon R. Bridle. **Loss of adaptive variation during evolutionary responses to climate change**. *Ecology Letters*, 2014; DOI: 10.1111/ele.12340

New analysis links tree height to climate

(excerpt from Science Daily)
What limits the height of trees? Is it the fraction of their photosynthetic energy they devote to productive new leaves? Or is it their ability to hoist water hundreds of feet into the air, supplying the green, solar-powered sugar factories in those leaves? A new paper attempts to resolve a debate as to which factors actually set maximum tree height, and how their relative importance varies in different parts of the world.
Thomas J. Givnish, Suen Chin Wong, Hilary Stuart-Williams, Meisha Holloway-Phillips, Graham D. Farquhar. **Determinants of maximum tree height inEucalyptusspecies along a rainfall gradient in Victoria, Australia**. *Ecology*, 2014; 140508070634001 DOI: 10.1890/14-0240.1

Japanese red cedars to replace Britain's traditional oaks in fight against climate change

(*excerpt from "The Telegraph, United Kingdom*"
Trees from America, Japan and southern Europe will be planted in Britain's forests to avoid them shrinking by 40 per cent by 2080 because of climate change. Japanese red cedar, giant redwoods and trees from the continent will replace oaks and pines in Britain's forests as woodlands must adapt to climate change to survive, a study suggests. Species of trees grown in the UK in the Victorian era are also set to return as foresters work to ensure Britain's woods can survive rising temperatures, frequent droughts and diseases. Experts have warned if nothing is done to change the composition of Britain's woodlands by 2080, forest production could decrease by more than 40 per cent as current trees struggle to survive.

POLICY AND MANAGEMENT - MITIGATION AND ADAPTATION

Shattering Myths to Help the Climate

(excerpt from the *New York Times)*
"Each new climate-change study seems more pessimistic than the last. This May and June, for example, were the hottest ones on record for the planet. Storms and droughts occur with increasing frequency. Glaciers are rapidly retreating, portending rising seas that could eventually displace hundreds of millions of people. Effective countermeasures now could actually ward off many of these threats at relatively modest cost. Yet despite a robust scientific consensus that greenhouse gas emissions are at the root of the problem, legislation to curb them has gone nowhere in Congress. In response, President Obama has proposed stricter regulations on electric utilities, which some scientists warn may be too little, too late."

Governor Inslee's Climate Tour

(excerpt from the *New York Times)*
"Billions of baby oysters in the Pacific inlets here are dying and Gov. Jay Inslee of Washington is busy spreading the bad news. "It used to be the canary in the coal mine," Mr. Inslee said in a recent interview. "Now it's the oyster in the half shell. You can't overstate what this means to Washington." Or to Mr. Inslee's ambitions. The Democratic governor, aided by what is expected to be millions of dollars from his billionaire friend Tom Steyer, is using the story of Washington's oysters — scientists say a rise in carbon levels has spiked the acidity of the Pacific and is killing off shellfish — to make the case for passing the most far-reaching climate change policies in the nation."

Roadside Land Offers Huge Carbon Storage Potential

(excerpt from The Daily Climate)

Rob Ament, of the Western Transportation Institute at Montana State University, led a recent study to gauge carbon storage potential on roadsides on federal lands. Shrubs, grasses, and other plants already along roads in U.S. National Parks, wildlife refuges, and other public lands currently are capturing about 7 million metric tons of carbon each year, Ament said in a report on his findings at this month's North American Congress for Conservation Biology in Missoula. That's equivalent to the annual carbon emissions of 5 million cars—without any effort made to optimize the mix of plantings and soil management practices for carbon storage. Add to that the strips of shrubbery and grass along U.S. highways outside federal lands. A previous study by the Federal Highway Administration concluded such roadside greenery stores enough carbon to counter the annual emissions of 2.6 million passenger cars.

U.S. to Join Global Alliance for Climate-Smart Agriculture

At the recent Africa Leaders Summit event, "Resilience and Food Security in a Changing Climate," Secretary of State John Kerry announced that the United States will join Global Alliance for Climate Smart Agriculture (GACSA). The nexus of food security, climate change, and resilience is finally getting some attention both here and in Africa.